

2 Speech, Audio, Gesture: A comparative study of speech in the call center: natural language call routing vs. touch-tone menus

Bernhard Suhm, Josh Bers, Dan McCarthy, Barbara Freeman, David Getty, Katherine Godfrey, Pat Peterson

April 2002 Proceedings of the SIGCHI conference on Human factors in computing systems: Changing our world, changing ourselves

Publisher: ACM Press

Full text available: pdf(428.09 KB) Additional Information: full citation, abstract, references, index terms

This paper presents a field study that compares natural language call routing with standard touch-tone menus. Call routing is the task of getting callers to the right place in the call center, which could be the appropriate live agent or automated service. Natural language call routing lets callers describe the reason for their call in their own words, instead of presenting them with a list of menu options to select from using the telephone touch-tone keypad. The field study was co ...

Keywords: call center, call routing, interactive voice response systems (IVRs), natural language, speech user interfaces, touch-tone, usability

3 Business process modeling/reengineering: Customer relations management: call center operations: modelling and simulation of a telephone call center Juta Pichitlamken, Alexandre Deslauriers, Pierre L'Ecuyer, Athanassios N. Avramidis December 2003 Proceedings of the 35th conference on Winter simulation: driving innovation

Publisher: Winter Simulation Conference

Full text available: pdf(194.26 KB) Additional Information: full citation, abstract, references

We consider a system with two types of traffic and two types of agents. Outbound calls are served only by blend agents, whereas inbound calls can be served by either inboundonly or blend agents. Our objective is to allocate a number of agents such that some service requirement is satisfied. We have taken two approaches in analyzing this staffing problem: We developed a simulation model of the call center, which allows us to do a what-if analysis, as well as continuous-time Markov chain (CTMC ...

Staff scheduling for inbound call centers and customer contact centers
Alex Fukunaga, Ed Hamilton, Jason Fama, David Andre, Ofer Matan, Illah Nourbakhsh
July 2002 Eighteenth national conference on Artificial intelligence

Publisher: American Association for Artificial Intelligence

Additional Information: full citation, abstract, references, index terms

The staff scheduling problem is a critical problem in the call center (or more generally, customer contact center) industry. This paper describes Director, a staff scheduling system for contact centers, Director is a constraint-based system that uses AI search techniques to generate schedules that satisfy and optimize a wide range of constraints and service quality metrics. Director has been successfully deployed at over 800 contact centers, with significant measurable benefits, some of which ar ...

5 Web services: A service creation environment based on end to end composition of



Web services

Vikas Agarwal, Koustuv Dasgupta, Neeran Karnik, Arun Kumar, Ashish Kundu, Sumit Mittal, Biplav Srivastava

May 2005 Proceedings of the 14th international conference on World Wide Web Publisher: ACM Press

Full text available: pdf(346.42 KB) Additional Information: full citation, abstract, references, index terms

The demand for quickly delivering new applications is increasingly becoming a business imperative today. Application development is often done in an ad hoc manner, without standard frameworks or libraries, thus resulting in poor reuse of software assets. Web services have received much interest in industry due to their potential in facilitating seamless business-to-business or enterprise application integration. A web services composition tool can help automate the process, from creating busines ...

Keywords: Web services composition, planning, semantic Web

6 Advanced tutorials: Call center simulations: call center simulation modeling: methods, challenges, and opportunities



Vijay Mehrotra, Jason Fama

December 2003 Proceedings of the 35th conference on Winter simulation: driving innovation

Publisher: Winter Simulation Conference

Full text available: pdf(569.21 KB) Additional Information: full citation, abstract, references

Using stochastic models to plan call center operations, schedule call center staff efficiently, and analyze projected performance is not a new phenomenon, dating back to Erlang's work in the early twentieth century. However, several factors have recently conspired to increase demand for call center simulation analysis.

- Increasing complexity in call traffic, coupled with the almost ubiquitous use of Skill-Based Routing.
- Rapid change in operations due to increased me ...

7

The experimental analysis of information security management issues for online

financial services

Mukul Gupta, Alok R. Chaturvedi, Shailendra Mehta, Lorenzo Valeri

December 2000 Proceedings of the twenty first international conference on Information systems

Publisher: Association for Information Systems

Full text available: pdf(228.80 KB) Additional Information: full citation, references, index terms

8 The Arena product family: enterprise modeling solutions

Deborah Sadowski, Vivek Bapat

December 1999 Proceedings of the 31st conference on Winter simulation: Simulation--a bridge to the future - Volume 1

Publisher: ACM Press

Full text available: pdf(185.47 KB) Additional Information: full citation, references, citings, index terms

Software/modelware tutorials a: Extend: the Extend simulation environment David Krahl

December 2002 Proceedings of the 34th conference on Winter simulation: exploring new frontiers

Publisher: Winter Simulation Conference

Full text available: pdf(581.58 KB) Additional Information: full citation, abstract, references, citings

The Extend simulation environment provides the tools for all levels of modelers to efficiently create accurate and credible models. Extend's modern, advanced design and rich feature set reduce the amount of time developing, validating, verifying, and analyzing simulation models. Model builders can use Extend's pre-built modeling components to quickly build and analyze systems with little or no programming. Simulation tool developers can use Extend's built-in, compiled language, ModL, to devel ...

10 <u>Software/modelware tutorials a: Extend: an interactive simulation tool: extend: an interactive simulation tool</u>

David Krahl

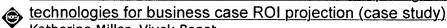
December 2003 Proceedings of the 35th conference on Winter simulation: driving innovation

Publisher: Winter Simulation Conference

Full text available: pdf(769.61 KB) Additional Information: full citation, abstract, references

The Extend simulation environment provides the tools for all levels of modelers to efficiently create accurate, credible, and usable models. Extend's design facilitates every phase of the simulation project, from creating, validating, and verifying the model, to the construction of a user interface which allows others to analyze the system. Simulation tool developers can use Extend's built-in, compiled language, ModL, to create reusable modeling components. All of this is done within a single ...

11 Simulation of the call center environment for comparing competing call routing



Katherine Miller, Vivek Bapat

December 1999 Proceedings of the 31st conference on Winter simulation: Simulation---a bridge to the future - Volume 2

Publisher: ACM Press

Full text available: pdf(114.92 KB) Additional Information: full citation, references, citings, index terms

12 Call center simulation in Bell Canada



Oryal Tanir, Richard J. Booth

December 1999 Proceedings of the 31st conference on Winter simulation: Simulation--a bridge to the future - Volume 2

Publisher: ACM Press

Full text available: pdf(104.85 KB) Additional Information: full citation, references, citings, index terms

13 Message classification in the call center

Stephan Busemann, Sven Schmeier, Roman G. Arens

April 2000 Proceedings of the sixth conference on Applied natural language processing

Publisher: Morgan Kaufmann Publishers Inc.

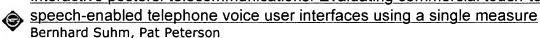
Full text available: pdf(877.64 KB)

Additional Information: full citation, abstract, references

Publisher Site

Customer care in technical domains is increasingly based on e-mail communication, allowing for the reproduction of approved solutions. Identifying the customer's problem is often time-consuming, as the problem space changes if new products are launched. This paper describes a new approach to the classification of e-mail requests based on shallow text processing and machine learning techniques. It is implemented within an assistance system for call center agents that is used in a commercial setti ...

14 Interactive posters: telecommunications: Evaluating commercial touch-tone and



March 2001 CHI '01 extended abstracts on Human factors in computing systems

Publisher: ACM Press

Full text available: To pdf(195.03 KB) Additional Information: full citation, abstract, references, index terms

This paper describes a method to quantify both cost-effectiveness and (objective) usability of telephone voice user interfaces in a single measure, based on end-to-end recordings of thousands of calls. This method is a valuable tool for usability engineering of commercially deployed, touch-tone and speech-enabled telephone voice user interfaces.

Keywords: call center, cost-effectiveness, evaluation methodology, speech and touchtone voice user interfaces, usability

15 The arena product family: enterprise modeling solutions

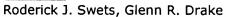
Deborah Sadowski, Vivek Bapat, Glenn Drake

December 1998 Proceedings of the 30th conference on Winter simulation

Publisher: IEEE Computer Society Press

Full text available: pdf(413.29 KB) Additional Information: full citation, references, index terms

16 <u>Software/modelware tutorials: Arena: the Arena product family: enterprise modeling</u> solutions



December 2001 Proceedings of the 33nd conference on Winter simulation

Publisher: IEEE Computer Society

Full text available: pdf(448.53 KB)

Additional Information: full citation, abstract, references, citings, index terms

This paper introduces the Arena suite of products for modeling, simulation, and optimization highlighting product architecture and technology features that are targeted toward successful deployment of simulation and Arena throughout an enterprise.

17 Simulation of a claims call center: a success and a failure



Roger Klungle

December 1999 Proceedings of the 31st conference on Winter simulation: Simulation---a bridge to the future - Volume 2

Publisher: ACM Press

Full text available: pdf(74.37 KB) Additional Information: full citation, references, citings, index terms

18 Industry track session: Automatic analysis of call-center conversations



Gilad Mishne, David Carmel, Ron Hoory, Alexey Roytman, Aya Soffer

October 2005 Proceedings of the 14th ACM international conference on Information and knowledge management CIKM '05

Publisher: ACM Press

Full text available: pdf(660.46 KB) Additional Information: full citation, abstract, references, index terms

We describe a system for automating call-center analysis and monitoring. Our system integrates transcription of incoming calls with analysis of their content; for the analysis, we introduce a novel method of estimating the domain-specific importance of conversation fragments, based on divergence of corpus statistics. Combining this method with Information Retrieval approaches, we provide knowledge-mining tools both for the call-center agents and for administrators of the center.

Keywords: automatic speech recognition, call centers

19 Software/modelware tutorials a: The arena product family: enterprise modeling solutions: the arena product family: enterprise modeling solutions Vivek Bapat, David T. Sturrock



December 2003 Proceedings of the 35th conference on Winter simulation: driving innovation

Publisher: Winter Simulation Conference

Full text available: Dpdf(494.74 KB) Additional Information: full citation, abstract, references

This paper introduces the Arena suite of products for modeling, simulation, and optimization highlighting product architecture and technology features that are targeted toward successful deployment of simulation and Arena throughout an enterprise.

A constraint satisfaction approach to predicting skilled interactive cognition



Alonso Vera, Andrew Howes, Michael McCurdy, Richard L. Lewis

April 2004 Proceedings of the SIGCHI conference on Human factors in computing systems

Publisher: ACM Press

Full text available: pdf(321.76 KB) Additional Information: full citation, abstract, references

In this paper we report a new approach to generating predictions about skilled interactive cognition. The approach, which we call Cognitive Constraint Modeling, takes as input a description of the constraints on a task environment, on user strategies, and on the human cognitive architecture and generates as output a prediction of the time course of interaction. In the Cognitive Constraint Models that we have built this is achieved by encoding the assumptions inherent in CPM-GOMS as a set of cons ...

Keywords: tools for usability evaluation, user modeling

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